UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,461	11/30/2001	Peter Waksman	OAQ-013RCE/PA-1230	2303

959 7590 01/11/2008
LAHIVE & COCKFIELD, LLP
ONE POST OFFICE SQUARE
BOSTON, MA 02109-2127

EXAMINER	
THOMPSON, JAMES A	

ART UNIT	PAPER NUMBER
2625	

MAIL DATE	DELIVERY MODE
01/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	10/000,461	WAKSMAN, PETER	
	Examiner	Art Unit	
	James A. Thompson	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 05 October 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 March 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some* c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05 October 2007 has been entered.

Response to Arguments

2. Applicant's arguments filed 05 October 2007 have been fully considered but they are not persuasive. Examiner agrees with Applicant that the present amendments to the claims distinguish over Braudaway (USPN 5,502,458). However, additional prior art has been discovered which renders the present claims obvious to one of ordinary skill in the art at the time of the invention. Accordingly, new grounds of rejection are set forth below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-3, 8-9, 12-14 and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (USPN 6,522,783 B1) and Braudaway (USPN 5,502,458).**

Regarding claim 1: Zeng discloses providing input color data for a group of pixels in an input color space (figure 1; and column 1, lines 33-43 and lines 49-54 of Zeng – *although this section refers to prior art, it shows how the palette table and index image used in the system of Zeng are obtained*), wherein one or more pixels contain input color data that is repeated (column 1, lines 27-33 of Zeng – *limited number of palette entries used to represent entire image, thus one or more pixel input color data values are repeated*); building an intermediate table for storing the input color data, wherein each

different input color data is assigned an index in the intermediate table (figure 1(32) and column 1, lines 33-38 of Zeng – *each pixel location in index image stores index to palette table*); storing the indices in an index array, wherein each index is stored at a position corresponding to a position in the input color data (figure 1(32) and column 1, lines 37-43 of Zeng – *index image contains index value for each pixel*); and building an intermediate palette for storing the input color data corresponding to the indices, wherein each input color data appears once in the intermediate palette (figure 1(30) and column 1, lines 37-42 of Zeng – *RGB values stored for each palette entry; each palette entry unique, and thus appears only once*).

Zeng does not disclose expressly converting the input color data in the intermediate palette to an output color data in an output color space, wherein the same input color data in different pixels is converted once to avoid repeated conversion calculation for the different pixels having the same input color data; and for each pixel in the group of pixels substituting the corresponding converted output color data for each input color data.

Braudaway discloses converting the input color data in the intermediate palette to an output color data in an output color space, wherein the same input color data in different pixels is converted once to avoid repeated conversion calculation for the different pixels having the same input color data (column 5, line 65 to column 6, line 4 of Braudaway – *the use of a transform matrix means that different pixels with the same input value are converted without the need for repeated conversion calculations*); and for each pixel in the group of pixels substituting the corresponding converted output color data for each input color data (figures 2B-2C and column 6, lines 14-24 of Braudaway).

Zeng and Braudaway are analogous art because they are from the same field of endeavor, namely color palette creation and color space conversion. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a direct matrix conversion for converting the colors of the intermediate palette, and substituting the corresponding converted output color values for each input color values, as taught by Braudaway. The motivation for doing so would have been to have an efficient means to convert input color pixel values into the color space corresponding to a particular output device (column 6, lines 19-24 of Braudaway). Therefore it would have been obvious to combine Braudaway with Zeng to obtain the invention as specified in claim 1.

Regarding claim 2: Zeng discloses using a hash function to determine the index in the intermediate table for each of the pixels in the group of pixels (column 1, lines 27-38 of Zeng – *index number associated with each pixel used to access location in intermediate table, correlation between index number and intermediate table entry constitutes a hash function*).

Regarding claim 3: Zeng discloses that the input color space comprises a (R,G,B) color space (column 1, lines 19-23 of Zeng).

Regarding claim 8: Zeng discloses that the electronic device is a computer system (column 1, lines 27-28 of Zeng – *computer processing performed, thus electronic device is a computer system*).

Regarding claim 9: Zeng discloses that the electronic device is an image reproducing apparatus (column 1, lines 27-33 of Zeng – *computer processing to reproduce an image*).

Regarding claim 12: Zeng does not disclose expressly that the group of pixels comprises a row of pixels.

Braudaway discloses that the group of pixels comprises a row of pixels (figure 1(28) and column 6, lines 40-44 of Braudaway). Since a display is used to output the image data (figure 1(28) and column 6, lines 40-44 of Braudaway) and said display is clearly two-dimensional, then said group of pixels must comprise a row of pixels.

Zeng and Braudaway are analogous art because they are from the same field of endeavor, namely color palette creation and color space conversion. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to group the pixels by row for processing. The suggestion for doing so would have been that the input color space is a (R,G,B) color space (column 1, lines 19-23 of Zeng), which is a common color space for displays, and thus a display would be a suitable output device. Therefore, it would have been obvious to combine Braudaway with Zeng to obtain the invention as specified in claim 12.

Regarding claim 13: Zeng discloses providing a set of input color data for pixels, said input color data encoding colors for the pixels in a first color space (figure 1; and column 1, lines 33-43 and lines 49-54 of Zeng – *although this section refers to prior art, it shows how the palette table and index image used in the system of Zeng are obtained*), wherein one or more pixels contain same color data that is repeated (column 1, lines 27-33 of Zeng – *limited number of palette entries used to represent entire image, thus one or more pixel input color data values are repeated*); for each of the pixels, determining an index for the pixel based on the color data for the pixel (figure 1(32) and column 1, lines 41-43 of Zeng); building an intermediate table for assigning an index to the input color data, wherein the indices of the same input color data are the same (figure 1(32) and column 1, lines 33-38 of Zeng – *each pixel location in index image stores index to palette table*); storing the indices in an index array, wherein each index is stored at a position corresponding to a position in the input color data (figure 1(32) and column 1, lines 37-43 of Zeng); and building an intermediate palette for storing the input color data corresponding to the indices, wherein each input color data appears once in the intermediate palette (figure 1(30) and

column 1, lines 37-42 of Zeng – *RGB values stored for each palette entry; each palette entry unique, and thus appears only once*).

Zeng does not disclose expressly converting the input color data in the intermediate palette into an output color data in an output color space, wherein the same input color data in different pixels is converted once to avoid repeated conversion calculation for the different pixels having the same input color data; and for each pixel substituting the corresponding converted output color data for each input color data.

Braudaway discloses converting the input color data in the intermediate palette into an output color data in an output color space, wherein the same input color data in different pixels is converted once to avoid repeated conversion calculation for the different pixels having the same input color data (column 5, line 65 to column 6, line 4 of Braudaway – *the use of a transform matrix means that different pixels with the same input value are converted without the need for repeated conversion calculations*); and for each pixel substituting the corresponding converted output color data for each input color data (figures 2B-2C and column 6, lines 14-24 of Braudaway).

Zeng and Braudaway are analogous art because they are from the same field of endeavor, namely color palette creation and color space conversion. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a direct matrix conversion for converting the colors of the intermediate palette, and substituting the corresponding converted output color values for each input color values, as taught by Braudaway. The motivation for doing so would have been to have an efficient means to convert input color pixel values into the color space corresponding to a particular output device (column 6, lines 19-24 of Braudaway). Therefore it would have been obvious to combine Braudaway with Zeng to obtain the invention as specified in claim 13.

Regarding claim 14: Zeng discloses that one of the first color space and the second color space is a (R,G,B) color space (column 1, lines 19-23 of Zeng).

Regarding claim 17: Zeng discloses that the method is performed by a processor (column 1, lines 27-28 of Zeng – *computer processing performed, thus the method is performed by a processor*).

Regarding claim 18: Zeng discloses a device (column 1, lines 27-33 of Zeng – *device is a computer or similar digital computational device*), comprising: a storage facility for storing an intermediate table (figure 1(22) of Zeng – *digital memory inherently required to store input color image*), wherein the intermediate table holds input color representations of a set of pixels coupled with indices, each index representing a different input color data (column 1, lines 33-43 of Zeng – *input color image converted to index image; each pixel location in index image stores index to palette table, with each entry*

of palette table storing unique RGB color values); a storage facility for storing an index array (figure 1 (32) of Zeng – *digital memory inherently required to store index image*), the index array storing the indices, wherein each index is stored at a position corresponding to a position in the input color data (column 1, lines 37-43 of Zeng – *index image contains index value for each pixel*); and a storage facility for storing an intermediate palette (figure 1(32) of Zeng – *digital memory inherently required to store intermediate palette*), the intermediate palette storing the input color data corresponding to the indices, wherein each input color data appears once in the intermediate palette (column 1, lines 37-42 of Zeng – *RGB values stored for each palette entry; each palette entry unique, and thus appears only once*).

Zeng does not disclose expressly a conversion facility for converting the input color representations of the set of pixels in the intermediate palette to output color representations in a second color space, wherein the same input color representation in different pixels is converted once to avoid repeated conversion calculations for the different pixels having the same input color representation.

Braudaway discloses a conversion facility (figure 2A-1(34) of Braudaway) for converting the input color representations of the set of pixels in the intermediate palette to output color representations in a second color space, wherein the same input color representation in different pixels is converted once to avoid repeated conversion calculations for the different pixels having the same input color representation (column 5, line 65 to column 6, line 4 of Braudaway – *the use of a transform matrix means that different pixels with the same input value are converted without the need for repeated conversion calculations*).

Zeng and Braudaway are analogous art because they are from the same field of endeavor, namely color palette creation and color space conversion. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a direct matrix conversion for converting the colors of the intermediate palette, and substituting the corresponding converted output color values for each input color values, as taught by Braudaway. The motivation for doing so would have been to have an efficient means to convert input color pixel values into the color space corresponding to a particular output device (column 6, lines 19-24 of Braudaway). Therefore it would have been obvious to combine Braudaway with Zeng to obtain the invention as specified in claim 18.

Further regarding claim 19: Braudaway discloses that the conversion facility is implemented by a processor (figure 1(11) and column 6, lines 30-33 of Braudaway).

Regarding claim 20: Zeng discloses mapping input color image data for the group of pixels in the first color space to indices, wherein the input color image data is stored in an intermediate table at positions of the indices (figure 1(32) and column 1, lines 33-43 of Zeng – *input color image converted to index image; each pixel location in index image stores index to palette table, with each entry of palette*

table storing unique RGB color values); storing the indices in an index array, wherein each index is stored at a position corresponding to a position in the input color data (column 1, lines 37-43 of Zeng – *index image contains index value for each pixel*); and building an intermediate palette for storing the input color data corresponding to the indices, wherein each input color data appears once in the intermediate palette (figure 1(30) and column 1, lines 37-42 of Zeng – *RGB values stored for each palette entry; each palette entry unique, and thus appears only once*).

Zeng does not disclose expressly converting the input color image data in the intermediate palette to an output color image data in the second color space, wherein the same input color image data in different pixels is converted once to avoid repeated conversion calculations for the different pixels having the same input color image data; and reconstructing the group of pixels in the second color space using the corresponding converted output color data.

Braudaway discloses converting the input color image data in the intermediate palette to an output color image data in the second color space, wherein the same input color image data in different pixels is converted once to avoid repeated conversion calculations for the different pixels having the same input color image data (column 5, line 65 to column 6, line 4 of Braudaway – *the use of a transform matrix means that different pixels with the same input value are converted without the need for repeated conversion calculations*); and reconstructing the group of pixels in the second color space using the corresponding converted output color data (figures 2B-2C and column 6, lines 14-24 of Braudaway).

Zeng and Braudaway are analogous art because they are from the same field of endeavor, namely color palette creation and color space conversion. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a direct matrix conversion for converting the colors of the intermediate palette, and reconstructing the group of pixels in a second color space, as taught by Braudaway. The motivation for doing so would have been to have an efficient means to convert input color pixel values into the color space corresponding to a particular output device (column 6, lines 19-24 of Braudaway). Therefore it would have been obvious to combine Braudaway with Zeng to obtain the invention as specified in claim 20.

Regarding claim 21: Zeng discloses using a hash computer programming function to determine the index in the intermediate table for each of the pixels in the group of pixels (column 1, lines 27-38 of Zeng – *index number associated with each pixel used to access location in intermediate table, correlation between index number and intermediate table entry constitutes a hash function*).

Regarding claim 22: Zeng discloses that the indexed position of the pixels is also stored in an index array at a location in the index array that corresponds to a location in the group of pixels (figure 1

(32) and column 1, lines 37-43 of Zeng – *index image contains index value for each pixel at the corresponding pixel position in the input image*).

Regarding claim 23: Zeng discloses that the first color space comprises a (R,G,B) color space (column 1, lines 19-23 of Zeng).

5. Claims 4-5, 10-11, 16 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US Patent 6,522,783 B1), Braudaway (US Patent 5,502,458), and Liang (US Patent 5,579,031).

Regarding claims 4, 16 and 24: The combination of Zeng and Braudaway does not disclose expressly that the output color space, and thus the second color space, comprises a (C,M,Y,K) color space.

Liang discloses converting a color space to a (C,M,Y,K) color space (figure 9 and column 15, lines 28-32 of Braudaway). Thus, the second color space is a (C,M,Y,K) color space.

The combination of Zeng and Braudaway is analogous art with respect to Liang because they are from the same field of endeavor, namely the conversion of color data from an input device color space to an output device color space so that the images look the same for both devices. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a (C,M,Y,K) color space for the output device color space, as taught by Liang. The motivation for doing so would have been to be able to output an image on a printer (column 15, lines 22-23 of Liang). Therefore, it would have been obvious to combine Liang with the combination of Zeng and Braudaway to obtain the invention as specified in claims 4, 16 and 24.

Regarding claims 5 and 25: The combination of Zeng and Braudaway does not disclose expressly that the output color space comprises a (C,M,Y) color space.

Liang discloses converting a color space (column 15, lines 28-32 of Braudaway) to a (C,M,Y) color space (column 11, line 66 to column 12, line 2 and column 12, lines 62-67 of Braudaway).

The combination of Zeng and Braudaway is analogous art with respect to Liang because they are from the same field of endeavor, namely the conversion of color data from an input device color space to an output device color space so that the images look the same for both devices. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a (C,M,Y) color space for the output device color space, as taught by Liang. The motivation for doing so would have been to be able to output an image on a printer (column 15, lines 22-23 of Liang), and the black (K) color is

dependent upon the (C,M,Y)-values (column 12, lines 62-67 of Liang). Therefore, it would have been obvious to combine Liang with the combination of Zeng and Braudaway to obtain the invention as specified in claims 5 and 25.

Regarding claim 10: The combination of Zeng and Braudaway does not disclose expressly that said electronic device is a copier.

Liang discloses that the electronic device used in matching colors produces a printed output of the converted image data (column 15, lines 22-27 of Liang), and is thus a copier.

The combination of Zeng and Braudaway is analogous art with respect to Liang because they are from the same field of endeavor, namely the conversion of color data from an input device color space to an output device color space so that the images look the same for both devices. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody the electronic device as a copier, as taught by Liang. The motivation for doing so would have been to be able to output an image on a printer (column 15, lines 22-23 of Liang). Therefore, it would have been obvious to combine Liang with the combination of Zeng and Braudaway to obtain the invention as specified in claim 10.

Regarding claim 11: The combination of Zeng and Braudaway does not disclose expressly that said electronic device is a printer.

Liang discloses that the electronic device used in matching colors is a printer (column 15, lines 22-27 of Liang).

The combination of Zeng and Braudaway is analogous art with respect to Liang because they are from the same field of endeavor, namely the conversion of color data from an input device color space to an output device color space so that the images look the same for both devices. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody the electronic device as a printer, as taught by Liang. The motivation for doing so would have been to be able to output a printed hard copy of an imager (column 15, lines 22-23 of Liang). Therefore, it would have been obvious to combine Liang with the combination of Zeng and Braudaway to obtain the invention as specified in claim 11.

6. **Claims 6-7, 15 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US Patent 6,522,783 B1), Braudaway (US Patent 5,502,458), and Winkelman (US Patent 5,668,890).**

Regarding claims 6-7, 15 and 26-27: The combination of Zeng and Braudaway does not disclose expressly that the input color space, and thus the first color space, comprises a grey scale color space; and the output color space, and thus the second color space, comprises a grey scale color space.

Winkelman discloses a grey scale color space for the input color space (column 6, lines 45-50 and lines 56-59 of Winkelman). If a black-and-white original is input (column 6, lines 45-50 of Winkelman), the only the luminance (L*) component of the CIELab color space will be used.

Winkelman further discloses that the output color space is a grey scale color space (figure 20 and column 5, lines 7-14 of Winkelman). Since the input color space is grey scale due to the fact that only the luminance (L*) component is used (column 6, lines 45-50 and lines 56-59 of Winkelman), then the output color space (figure 20(L^*_{KOR},a^*_{KOR},b^*_{KOR}) must also be grey scale (only L^*_{KOR} used).

The combination of Zeng and Braudaway is analogous art with respect to Winkelman because they are from the same field of endeavor, namely the conversion and correction of color spaces in digital image systems so that the image input with one device will look the same when output by another device. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a grey scale color space for the input color space and the output color space. The suggestion for doing so would have been that some images are black-and-white image (column 6, lines 45-50 of Winkelman), and thus are better represented with a grey scale color space. Therefore, it would have been obvious to combine Winkelman with the combination of Zeng and Braudaway to obtain the invention as specified in claims 6-7, 15 and 26-27.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

31 December 2007

James A. Thompson
Examiner
Technology Division 2625